embodiment, input **110** is coupled to and driven by shaft **31**. First rotor section **50** is coupled to fan assembly **12** using a cone **122**, and fan assembly **12** is coupled to first gearbox output **111** using an extension shaft **121**. Second rotor section **60** is coupled to second gearbox output **112** utilizing a cone **120**. In one embodiment, gearbox **100** has a gear ratio of approximately 2.0 to 1 such that fan assembly **12** and first rotor section **50** each rotate at a rotational speed that is approximately one-half the rotational speed of second rotor section **60**. In another embodiment, fan assembly **12** and first rotor section **50** each rotate at a rotational speed that is approximately twice the rotational speed of second rotor section **60**. In another exemplary embodiment, gearbox **100** has a gear ratio such that fan assembly **12** and first rotor section **50** each rotate at a rotational speed that is between approximately 0.67 and approximately 2.1 times faster than the rotational speed of second rotor section **60**.

[0021] Turbofan engine assembly **10** also includes a first bearing assembly **130**, that in the exemplary embodiment, is a thrust bearing that is positioned between gearbox housing **101** and fan disk **26** to facilitate transmitting the thrust loads generated by fan assembly **12** to ground, i.e., fan frame **15**. Turbofan engine assembly **10** also includes a second bearing assembly **140**, that in the exemplary embodiment, is a thrust bearing that is positioned to facilitate transmitting the thrust loads generated by second rotor section **60** to ground, i.e., fan frame **15**. Turbofan engine assembly **10** also includes a third bearing assembly **150**, that in the exemplary embodiment, is a thrust bearing that is positioned between drive shaft **31** and gearbox housing **101** to facilitate balancing the thrust load generated by low-pressure turbine **20** to ground. As such, gearbox housing **101** ties thrust bearings **130**, **140**, and **150** to ground independent of the gearbox gearing.

[0022] FIG. **3** is a cross-sectional view of the gearbox **100** shown in FIG. **2**. FIG. **4** is an end view of gearbox **100** shown in FIG. **2**. As discussed previously herein, gearbox **100** is connected to a fixed or stationary component of turbofan engine assembly **10**, such as frame **15** of core turbine engine **13**, as shown in FIG. **2**. In the exemplary embodiment, gearbox **100** is a planetary gearbox having a substantially toroidal cross-sectional profile such that gearbox **100** substantially circumscribes drive shaft **31**. Gearbox **100** includes a set of planet gears **160** cooperating to produce differential speeds. More specifically, each planet gear **160** includes a first gear portion **162** having a first diameter **163** and a second gear portion **164** having a second diameter **165** that is greater than first diameter. In the exemplary embodiment, first and second gear portions **162** and **164** are formed together such that gear **160** is a unitary structure. Optionally, first and second gear portions **162** and **164** are formed separately and coupled together using a fastener, a welding technique, or a brazing technique, for example.

[0023] During assembly, fan assembly **12** and first rotor section **50** engage first gear portion **162** via extension shaft **121** and second rotor section **60** engages first gear portion **162** via cone **120**. More specifically, as shown in FIG. **4**, extension shaft **121** engages the radially inner side of first gear portion **162** and cone **120** engages the radially outer side of first gear portion **162** such that cone **120** and extension shaft **121** each rotate in an opposite direction.

[0024] The turbofan engine assemblies described herein each include a counter-rotating (CR) booster compressor that is coupled to a planetary gearbox to enable the speed of each rotor section of the booster compressor to be operated to achieve maximum engine efficiency. In this embodiment, the turbofan engine assembly includes a fan assembly and a counter-rotating booster compressor that are each driven by a gearbox that is driven by the low-pressure turbine. More specifically, the counter-rotating booster has stages **2** and **4** rotating at the same speed as the fan assembly, whiles stages, **1**, **3**, and **5** counter rotate with a speed that can be higher than the fan speed. This arrangement allows a substantial pressure rise to occur in the booster compressor utilizing a relatively few number of stages.

[0025] FIG. **5** is an enlarged cross-sectional view of another booster compressor arrangement that may be utilized with turbofan engine assembly **10** shown in FIG. **1**. In this arrangement, counter-rotating booster compressor also includes first rotor section or spool **50** that, in the exemplary embodiment, includes two stages **52**, and second rotor section or spool **60** that, in the exemplary embodiment, includes three stages **62**. In this arrangement, second rotor section **60** is coupled to second gearbox output **112** utilizing cone **120** as shown in FIG. **2**. However, in this arrangement, fan assembly **12** is coupled directly to shaft **31**, via a shaft extension **202** such that low-pressure turbine **20** (shown in FIG. **1**) drives fan assembly **12**. Moreover, rather that coupling booster **22** to fan assembly **12**, as shown in FIG. **2**, booster **22** is coupled to first gearbox output **111** utilizing a cone **204**.

[0026] As such, in this arrangement, turbofan engine assembly **10** includes a thrust bearing **210** that is positioned between extension shaft **202** and cone **204** to facilitate balancing the thrust loads generated by fan assembly **12** and booster compressor spool **50**. Turbofan engine assembly **10** also includes a roller bearing **220** that is positioned between cone **204** and cone **120** to facilitate providing radial support for cone **204**. In this arrangement, turbofan engine assembly **10** also includes second bearing assembly **140**, that in the exemplary embodiment, is a thrust bearing that is positioned to facilitate transmitting the thrust loads generated by second rotor section **60** to ground, i.e., fan frame **15**. Turbofan engine assembly **10** also includes a third bearing assembly **150**, that in the exemplary embodiment, is a thrust bearing that is positioned between drive shaft **31** and gearbox **100** to facilitate transmitting the residual thrust load generated by fan assembly **12**, booster rotor **50**, and low-pressure turbine **20** to ground, via gearbox housing **101**.

[0027] FIG. **6** is an enlarged cross-sectional view of another booster compressor arrangement that may be utilized with turbofan engine assembly **10** shown in FIG. **1**. In this arrangement, counter-rotating booster compressor **22** also includes first rotor section or spool **50** that, in the exemplary embodiment, includes two stages **52**, and second rotor section or spool **60** that, in the exemplary embodiment, includes three stages **62**. In this arrangement, first rotor section **50** is coupled to fan assembly **12** using cone **122**, and fan assembly **12** is coupled to shaft **31**, via a shaft extension **202** such that low-pressure turbine **20** (shown in FIG. **1**) drives fan assembly **12** and booster rotor **50**, and such that shaft **31** drives gearbox **100**. Moreover, second rotor section **60** is coupled to gearbox output **112**.

[0028] In this arrangement, turbofan engine assembly **10** also includes second bearing assembly **140**, that in the exemplary embodiment, is a thrust bearing that is positioned to facilitate transmitting the residual thrust loads generated by second rotor section **60** to ground, i.e., fan frame **15**. Turbofan engine assembly **10** also includes a third bearing